

REMARKS

Claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are currently pending in the application. Claims 1, 2, 3, 5, 6, 8, 18, 19, 20, 22, 23, and 25 have been amended.

35 U.S.C. § 101

Claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are rejected under 35 U.S.C. § 101 because the claimed invention due to the fact that the scope of the claims is directed to both statutory classification. Applicants have amended the claims to clearly set forth the statutory classification. Therefore, claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are allowable under 35 U.S.C. § 101.

35 U.S.C. § 112 Claim Rejections

Claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants have amended the claims to clearly comply with the provisions of 35 U.S.C. § 112, first paragraph. Therefore, claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are allowable under 35 U.S.C. § 112, first paragraph.

Claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Applicants have amended the claimed invention to particularly point out and distinctly claim the subject matter which Applicants regard as there invention to comply with the provisions of 35 U.S.C. § 112, second paragraph. Therefore, presently amended claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are allowable under 35 U.S.C. § 112, second paragraph.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent 5,655,704 to Sakemi et al. in view of Yeh et al

Claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakemi et al. (U.S. Patent 5,655,704) in view of Yeh et al. (U.S. 5,607,099). Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants assert that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure.

Applicants assert that any combination of the Sakemi et al. reference and the Yeh et al. reference does not and cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the presently claimed inventions because, at the very least, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the Sakemi et al reference or to combine the reference teachings of the Yeh et al. reference therewith, there has been no showing of a reasonable expectation of success for any combination of the cited prior art, and any combination of the cited prior art does not teach or suggest all of the claim limitations.

Turning to the cited prior art, the Sakemi et al. reference teaches or suggests a solder ball mounting apparatus using a template 4 to position solder balls 3 from a hopper 12 onto pads 2a of a substrate 2. The substrate 2 only having a plurality of electrodes 2a above the surface of the substrate 2, not having any electrodes whatsoever recessed into the surface of the substrate 2. There is no teaching or suggestion in the Sakemi et al. reference to dispense solder paste from the hopper 12 into or through a template 4 onto the substrate 2. There is no teaching or suggestion whatsoever in the Sakemi et al. reference for dispensing solder balls 3 onto electrodes 2a located in recesses in a substrate 2.

The Yeh et al. reference teaches or suggests a carrier device 10 having cavities 12 in a surface for transferring solder paste 14 thereinto to be heated into solder balls 16 to attach the solder balls 16 to the solder pad 20 of a flip chip 18. There is no teaching or suggestion whatsoever in the Yeh et al. reference for dispensing solder balls 16 onto conductive sites located in recesses in a substrate.

Applicants assert that there is no suggestion whatsoever in the Sakemi et al reference itself or in the knowledge available in the art to modify the template 4 to dispense solder balls onto conductive sites of a substrate having an upper surface, the conductive sites comprising one of recessed sites and level sites with respect to said upper surface such as set forth in the presently claimed inventions of presently amended independent claims 1 and 18.

Applicants assert that independent claims 1 and 18 clearly set forth as claim limitations calling for “a positioning apparatus for moving said hopper over said pattern relative said stencil plate to place said spheres into said plurality of through-holes and thereby onto said surface of said substrate, said substrate having an upper surface having conductive sites comprising one of recessed sites and level sites with respect to said upper surface” and “a positioning apparatus for moving said hopper over said pattern relative of said stencil plate to position said spheres into said plurality of through-holes and thereby onto said proximate surface of said substrate, said substrate having an upper surface having conductive sites comprising one of recessed sites and level sites with respect to said upper surface.” With regard to presently amended independent claims 1 and 18, any combination of the the Sakemi et al. reference and the Yeh et al. reference fails to teach or suggest such the claim limitations. Support for the amendment can be found in the specification, page 8, lines 13 through 17: “The method of the invention may be applied to the placement of conductive spheres 12 on any conductive site 14, whether the site, e.g. bond pad projects from the substrate 20 or is recessed therein.”

The Sakemi et al. reference, on the other hand teaches or suggests “a plurality of electrodes” which stand out from the surface of the substrate. Note that the reference illustrates only electrodes which stand out from the surface. See Fig. 4. Furthermore, language in the reference indicates that it does not contemplate conductive sites recessed into the surface of a substrate. For example, as recognized in Applicants’ disclosure, the use of recessed contacts may eliminate the need for applying flux to the surface of the contacts. See page 5, lines 22 through

24, where the specification sets forth that flux may not be needed when using “recessed bondpads.” In contrast, in column 4, lines 57 and 58, Sakemi indicates that with respect to the invention described therein, flux is required (“[f]lux is applied beforehand to the top of each electrode on the workpiece”). Other parts of Sakemi support the idea that the application of flux is a requirement, such as column 6, lines 23 through 27, in which it is indicated that flux is applied to prevent the solder ball from “dislocating from the electrode.”

Additionally, the Yeh et al. reference substrate merely has recesses to hold solder paste, not solder balls dispensed thereinto of a substrate having contact sites located in recesses. There is no suggestion for any use of the Yeh et al. reference to modify the Sakemi et al. reference except Applicants’ disclosure.

Further, there has been no showing of success for any combination of the Sakemi et al. reference and the Yeh et al. reference. Applicants assert that there can be no successful combination thereof because the cited prior art teaches away from any combination. Applicants assert that any combination of the cited prior art would result in the Sakemi et al. reference being modified to dispense solder paste through the template 4 into the substrate cavities 12 of the Yeh et al. reference. Such would destroy the Sakemi et al. reference because it only teaches or suggests the dispensing of solder balls 3 onto raised electrodes 2a of a substrate 2, not solder paste into a recess of a carrier workpiece.

Applicants further assert that any combination of the Sakemi et al. reference and the Yeh et al. reference fails to teach or suggest all the claim limitations of the presently claimed inventions of presently amended independent claims 1 and 18 calling for “a positioning apparatus for moving said hopper over said pattern relative said stencil plate to place said spheres into said plurality of through-holes and thereby onto said surface of said substrate, said substrate having an upper surface having conductive sites comprising one of recessed sites and level sites with respect to said upper surface” and “a positioning apparatus for moving said hopper over said pattern relative of said stencil plate to position said spheres into said plurality of through-holes and thereby onto said proximate surface of said substrate, said substrate having an upper surface having conductive sites comprising one of recessed sites and level sites with respect to said upper surface.” Applicants assert that any combination of the Sakemi et al. reference and the Yeh et al. reference merely teaches or suggests the placement of solder balls on the electrodes of a

substrate for the heating thereof and the application of solder paste on the heated solder balls. Such is not the presently claimed inventions of presently amended independent claims 1 and 18. Therefore, such presently amended independent claims 1 and 18 are allowable.

Applicants respectfully additionally assert that since presently amended independent claims 1 and 18 are allowable, claims 2, 3, 6 through 8, 19, 20, 23 and 25 are allowable as depending from allowable independent claims 1 and 18.

Obviousness Rejection Based on U.S. Patent 5,655,704 to Sakemi et al. in view of U.S. Patent 5,607,099 to Yeh et al.

Claims 5 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakemi et al. (U.S. Patent 5,655,704) in view of Yeh et al. (U.S. Patent 5,607,099). Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants assert that dependent claims 5 and 22 are allowable as depending from allowable presently amended independent claims 1 and 18 respectively.

CONCLUSION

Claims 1 through 3, 5 through 6, 8 through 20, 22 through 23, and 25 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



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